Instructions

Part 1: Risk and Return Analysis (10 marks)

Calculate the annual average return, standard deviation, Sharpe ratio of each stock and the S&P500 index. Use the 3 Month Treasury Bill Rate as risk free rate. Calculate the correlation coefficients of the returns of each stock and the S&P500 index. Use this information to complete Table 1 ~~~~~~. You might want to support your analysis with a figure in the appendix. Discuss in Part 1 your main findings. Compare the stocks with each other and the S&P index.

Part 2: ESG Analysis (10 marks)

Complete Table 2 ██████████████████████████████████████ on ESG risks using the Refinitiv ESG score data and Firm-Level Climate Change Exposure date. From the Firm-Level Climate Change Exposure date, use the following measures: CCexposure (cc_expo_ew), CCexposure Opportunity (op_expo_ew), CCexposure Regulatory (rg_expo_ew), CCexposure Phyisical (ph_expo_ew).

Discuss the main ESG risks for each stock. Are the performing better or worse than the industry (siccode) average? Discuss one controversy per stock (or 0 if there are no controversies). Discuss the exposures related to opportunity, physical, and regulatory shocks associated with climate change for each stock. Use the latest annual report or sustainability report of the company and discuss how the company plans to mitigate ESG risks. Cite the Annual Report and page number in a footnote if you use information from the annual or sustainability report.

Part 3: Portfolio allocation (20 marks)

Calculate the Variance-Covariance-Matrix using annual variance and co-variance measures and report the matrix in in Table 3 ████████████████████████████████████. Next, calculate the weights of the minimum-variance portfolio and the tangency portfolio and report the weights, portfolio returns, portfolio variance and Sharpe ratio in Table 4. Calculate the Covariance (Minimum-variance, Tangency portfolio). Report in the appendix the calculations (not the code) of these numbers.

Calculate the portfolio standard deviation, portfolio expected return, Sharpe ratio, and portfolio ESG score of different weights on the minimum-variance portfolio and the tangency portfolio in Table 5 ██████████████████████████████████ You do not have to provide the calculations in the appendix. Using these two portfolios, create a figure with the portfolio frontier and a figure with the ESG frontier.

Discuss in the assignment the weights of the tangency portfolio and the weights on the three assets that guarantee the minimum ESG score of the ██████ Sustainable Equity Fund (You could decide yourself the minimum ESG score). Compare the tangency portfolio with the portfolio of the mutual fund and explain the differences to the potential investors in the prospectus.

Part 4: Active ownership (20 marks)

At Prospectus ██████ Sustainable Future Equity Fund, the fund believes that active engagement with the companies in which the fund invests is essential for promoting sustainable business practices and maximizing long-term value for the shareholders. As part of the fund's commitment to environmental, social, and governance (ESG) considerations, the fund actively exercises our rights as shareholders to engage with company management on key ESG issues.

Discuss for each stock a shareholders' proposal the ██████ Sustainable Future Equity Fund is planning to file in the upcoming shareholders meeting. This shareholder proposal should address on of the ESG risks discussed in Part 2. Discuss the rationale behind each proposal and its potential impact on promoting sustainable business practices and maximizing long-term value for shareholders.

Part 5: Performance or Sustainability (20 marks)

Discuss the dilemma faced by fund managers regarding whether to prioritize sustainability or performance, based on the academic studies discussed in class (you do not have to search for additional studies).

Reference

Use the APA citation style (Copy paste the citation from google scholar). You may use other styles, as long as it is consistent.

Figures

Report all figures that support your analysis in the appendix.

Marking criteria

Assignment-specific marking criteria:

Part 1 to 5 (80 marks)

1. Understanding of Sustainable Finance Principles
   o Systematically understand the role of finance in the transition to a sustainable economy, and critically evaluate various perspectives on the social responsibility of companies.
   o Understand what ESG investment is, most common types of ESG investments, ESG ratings, ESG regulation, and discuss and debate current challenges in impact investing.
   o Be able to synthesize current research in sustainable finance and use this to critically assess current developments in sustainable finance.
2. Data Analysis and Interpretation
   o Accurately calculates and interprets risk and return metrics for assigned stocks and the S&P500 index.
   o Provides insightful analysis of the portfolio allocation and portfolio performance metrics, such as portfolio returns, variance, Sharpe ratio, and average ESG score.

Data Visualization Proficiency (20 marks)

3. Creates clear data visualizations using Python libraries such as Matplotlib.
4. Demonstrates creativity and proficiency in selecting appropriate visualization types (e.g., line charts, bar plots, scatter plots) to represent different types of data.